

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-15 (Canceled).

Claim 16 (Currently amended): A process for manufacturing a ~~porous structure~~  
bipolar plate or electrode/bipolar plate according to Claim ~~[[7]]~~ 17, further comprising  
producing said carbon-fibre matrix by the needle-punching of carbon fibres.

Claim 17 (New): A process for manufacturing a bipolar plate or electrode/bipolar  
plate comprising:

growing an impermeable layer of a carbon element on one face or on two opposing  
faces of a carbon-fibre matrix, and

densifying the carbon element layer;

wherein

the bipolar plate comprises:

a porous structure comprising the porous carbon-fibre matrix and

the impermeable layer of a carbon element, wherein the carbon element

comprises carbon fibers, carbon nanotubes or mixtures thereof, and

the impermeable layer is on at least one face of the porous structure, and is linked to  
the porous carbon-fiber matrix via carbon-carbon bonds.

Claim 18 (New): The process according to Claim 17, wherein the carbon fibers of the  
carbon element of the impermeable layer are produced by a process comprising:

impregnating an appropriate face of the carbon fibre matrix with precursor monomers  
of a polymer fibre;

polymerizing the monomers to form a precursor polymer on the carbon fibre matrix;  
spinning the precursor polymer impregnated on the carbon fibre matrix; and  
pyrolyzing the precursor polymer to form the carbon fibres.

Claim 19 (New): The process according to Claim 18, wherein the precursor polymer is polyacrylonitrile.

Claim 20 (New): The process according to Claim 17, wherein the carbon fibers of the carbon element of the impermeable layer are produced by a process comprising:

impregnating an appropriate face of the carbon fibre matrix with petroleum pitch;  
spinning the matrix impregnated with petroleum pitch to obtain pitch fibres; and  
pyrolyzing the pitch fibres to form the carbon fibres.

Claim 21 (New): The process according to Claim 17, wherein the carbon nanotubes are produced by a process comprising:

impregnating the appropriate face of the carbon matrix with an aqueous solution containing one or more salt of a metal catalyst for growth of nanotubes;

decomposing the one or more salt of a metal catalyst to form an oxide of the metal by heat treatment;

reducing the metal oxide;

contacting the carbon matrix impregnated with the reduced metal oxide catalyst with a gaseous carbon precursor; and

cracking the carbon precursor by heating to a decomposition temperature to form the carbon nanotubes; wherein

the gaseous carbon precursor is at least one selected from the group consisting of acetylene, ethylene, propylene and methane.

Claim 22 (New): The process according to Claim 21, wherein the one or more salt of a metal catalyst is a nitrate or acetate of a metal selected from the group consisting of Co, Ni and Fe.

Claim 23 (New): The process according to Claim 17, wherein the densifying the carbon element layer comprises liquid processing or chemical vapour infiltration.